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**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known see 37 C.F.R. 1.5)

INTERNATIONAL APPLICATION NO

INTERNATIONAL FILING DATE

(EARLIEST) PRIORITY DATE CLAIMED

PCT/JP00/01560

MARCH 15, 2000

MARCH 19, 1999

TITLE OF INVENTION

**TRANSMITTING APPARATUS, RECEIVING APPARATUS,
TRANSMITTING AND RECEIVING APPARATUS, TRANSMITTING
METHOD, RECEIVING METHOD, AND TRANSMITTING AND
RECEIVING METHOD**

APPLICANT(S) FOR DO/EO/US **Fumihiko NISHIO, Yoshihisa GONNO, Kazuo HARAOKA, Yasuaki
YAMAGISHI and Kazuhiko TAKABAYASHI.**

Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
- ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
- ☐ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
- ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
- ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 16 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
- ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter
16. ☐ Other items or information:

PCT/RO/101

PCT/ISA/ 210

19 Sheets of Drawings, 1 Page Abstract

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450106-02405

17. ☒ The following fees are submitted

(CALCULATIONS /PTO USE ONLY)

Basic National Fee (37 CFR 1.492(a)(1)-(5):

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37CFR 1.445(a)(2) paid to USPTO
and International Search Report not prepared by the EPO or JPO.. .. \$1,000.00

International preliminary examination fee (37 C.F.R. 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO..... \$ 860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....	\$ 710.00
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International preliminary examination fee paid to USPTO (37 CFR 1.482)
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$ 690.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(1)-(4) \$ 100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = (\$ 860.00

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)). **(S)**

24	Claims	/Number Filed	/	Number Extra	/Rate	(\$
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Total Claims	/	24	- 20 =	/	4	/X \$18.00	(\$ 72.00)
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Independent Claims	/	15	- 3 =	/	12	/X \$80.00	(\$ 960.00)
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MULTIPLE DEPENDENT CLAIM(S) (if applicable)	/+ \$270.00	(\$
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TOTAL OF ABOVE CALCULATIONS = (\$1,892.00)

☐ Applicant claims small entity status. See 37 C.F.R. 1.27. The fees indicated above are reduced by 1/3.

SUBTOTAL = (\$1,892.00)

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). \$ +

TOTAL NATIONAL FEE = (\$1,892.00)

Fee for recording the enclosed assignments (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00** per property +

TOTAL FEES ENCLOSED = (\$1,892.00)

(Amount to be: \$

(charged: S

- a. ☒ A check in the amount of \$1,892.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0320. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

WILLIAM S. FROMMER
FROMMER LAWRENCE & HAUG LLP
 745 FIFTH AVENUE
 NEW YORK, NEW YORK 10151

Dated: November 17, 2000

SIGNATURE

William S. Frommer
NAME

25,506
REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : NISHIO ET AL.
Int'l Appln. No. : PCT/JP00/01560
Int'l Filing Date : March 15, 2000
Title of Invention : TRANSMITTING APPARATUS, RECEIVING
APPARATUS, TRANSMITTING AND
RECEIVING APPARATUS, TRANSMITTING
METHOD, RECEIVING METHOD, AND
TRANSMITTING AND RECEIVING METHOD

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PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Box PCT
Washington, D.C. 20231

Dear Sir:

Prior to the issuance of the first Office Action, please amend the above-identified application as follows:

IN THE CLAIMS:

Claim 4, line 2, please delete “2, or 3,”;

Claim 5, line 2, please delete “or 3”;

Claim 16, line 2, please delete “or 15”;

Add new claims 21-24 as follows:

--21. The transmitting apparatus as set forth in claim 2, further comprising:

converting means for converting the format of the meta information into a transmission format.

22. The transmitting apparatus as set forth in claim 3, further comprising:

converting means for converting the format of the meta information into a transmission format.

23. The transmitting apparatus as set forth in claim 3,

wherein data that has been received through said communication controlling apparatus is data that represents a use history of meta information of the receiving apparatus.

24. The transmitting method as set forth in claim 15, further comprising the step of:

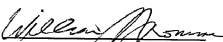
receiving a meta information use history from the receiving apparatus and transmitting a meta information schema, meta information, and an inference rule that have been changed so that they have respective data structures corresponding to the meta information use history.--

REMARKS

Claims 4, 5, and 16 have been amended to correct the dependency thereof. Claims 21-24 have been added.

An early examination on the merits of this application is respectfully solicited.

Respectfully submitted,
FROMMER LAWRENCE & HAUG LLP

By: 
William S. Frommer
Reg. No. 25,506
(212) 588-0800

450106-02405

DESCRIPTION

Transmitting Apparatus, Receiving Apparatus,
Transmitting and Receiving Apparatus, Transmitting
Method, Receiving Method, and Transmitting and
5 Receiving Method
Technical Field

The present invention relates to a
transmitting apparatus, a receiving apparatus, a
transmitting and receiving apparatus, a transmitting
10 method, a receiving method, and a transmitting and
receiving method that are used in the field of a
technology for delivering video and audio data to an
infinite number of subscribers and that allow delivered
data to be effectively accessed.

15 Related Art

Many techniques have been proposed as data
delivering systems. For example, on the Internet, data
is delivered using WWW (World Wide Web) corresponding
to HTTP (Hyper Text Transfer Protocol). To retrieve
20 desired data from a huge amount of a data collection of
WWW (World Wide Web), the use of meta information is
becoming common. The meta information represents
information about each title of data. As an example of
systems that selectively receive data corresponding to
25 meta information from WWW, PICS (Platform for Internet
Content Selection) and RDF (Resource Description
Framework) have been proposed.

In a digital broadcast, meta information such as a program title and broadcast time data that are structural elements of EPG (Electronic Program Guide) is transmitted in the format of EIT (Event Information Table). Information of EPG is represented as a section type table or the like referred to as SI (Service Information). A receiving apparatus extracts relevant information from the table and displays the extracted information on its screen. With EPG, the user can select data as a program from successive broadcast data.

Although a digital broadcast is unidirectionally transmitted to a very large number of terminal apparatuses, a large amount of data can be simultaneously transmitted. Thus, it is advantageous to merge a digital broadcast and a network. In reality, meta information is added to contents data on the Internet or contents data of a digital broadcast. Since a receiving apparatus should effectively access contents data using such meta information, the receiving apparatus should effectively search required meta information. In addition, when meta information is added to contents data, the amount of transmission data increases. Thus, it is necessary to effectively add and transmit meta information.

Disclosure of the Invention

Therefore, an object of the present invention

is to provide a transmitting apparatus, a receiving apparatus, a transmitting and receiving apparatus, a transmitting method, a receiving method, and a transmitting and receiving method that allow the transmission efficiency of meta information of the transmitting apparatus or the searching efficiency of the receiving apparatus to be improved without an increase of the data amount of the meta information.

To accomplish the above-described problem, the invention of claim 1 is a transmitting apparatus for providing digital contents, comprising a meta information storing means for storing meta information about data that is transmitted, a meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted, an inference rule storing means for storing an inference rule about the data structure of meta information about data that is transmitted, and a transmitting means for transmitting the meta information, the meta information schema, the inference rule, and contents data through a transmission path.

According to the invention of claim 1, since an inference rule is transmitted, the data amount of meta information to be transmitted can be reduced.

The invention of claim 2 is a transmitting apparatus for providing digital contents, comprising a

meta information storing means for storing meta
information about data that is transmitted, a meta
information schema storing means for storing a meta
information schema that defines the data structure of
5 meta information about data that is transmitted, a
transmitting means for transmitting the meta
information, the meta information schema, and contents
data through a transmission path, a communication
controlling means for communicating with a receiving
10 apparatus, and a changing means for changing the
structure of the meta information schema that has been
stored in the meta information schema storing means and
the meta information that has been stored in the meta
information storing means corresponding to data that
15 has been received through the communication controlling
means.

According to the invention of claim 2, the
transmitting apparatus is informed of a meta
information use history, for example, the applied
20 frequency of a meta information schema on the receiving
side. Thus, a meta information schema transmitted from
the transmitting apparatus is changed. In other words,
an attribute whose applied frequency is low is deleted
the transmission thereof becomes unnecessary. Thus,
25 the data amount of a meta information schema to be
transmitted can be reduced.

The invention of claim 3 is a transmitting

apparatus for providing digital contents, comprising a
meta information storing means for storing meta
information about data that is transmitted, a meta
information schema storing means for storing a meta
5 information schema that defines the data structure of
meta information about data that is transmitted, an
inference rule storing means for storing an inference
rule about the data structure of meta information about
data that is transmitted, a transmitting means for
10 transmitting the meta information, the inference rule,
and contents data through a transmission path, a
communication controlling means for communicating with
a receiving apparatus, and a changing means for
changing the inference rule that has been stored in the
15 inference rule storing means corresponding to data that
has been received through the communication controlling
means.

According to the invention of claim 3, the
transmitting apparatus is informed of a meta
20 information use history, for example, the applied
frequency of an inference rule on the receiving side.
Thus, an inference rule transmitted from the
transmitting apparatus is changed. In other words, an
inference rule whose applied frequency is low is
25 deleted or the transmission thereof becomes
unnecessary. Thus, the data amount of an inference
rule to be transmitted can be reduced.

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The invention of claim 6 is a receiving apparatus for receiving data for providing digital contents, comprising a receiving means for receiving at least meta information and contents data through a transmission path, a meta information schema storing means for storing a meta information schema, a profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema, a user profile storing means for storing a user profile generated by the profile operating means, a meta information filtering means for selecting and receiving meta information corresponding to the user profile, a meta information storing means for storing meta information that has been selected and received, a meta information operating means for searching and/or browsing meta information, an inference rule storing means for storing an inference rule about the data structure of meta information, a data storing means for receiving and storing data of contents represented by the meta information that has been selected, and a data operating portion for operating data that has been stored in the data storing means.

According to the invention of claim 6, with an inference rule, the data amount of meta information to be transmitted can be reduced.

The invention of claim 7 is a receiving

apparatus for receiving data for providing digital contents data, comprising a receiving means for receiving at least meta information and contents data through a transmission path, a meta information schema storing means for storing a meta information schema that defines the data structure of meta information, a profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema, a user profile storing means for storing a user profile generated by the profile operating means, a meta information filtering means for selecting and receiving meta information corresponding to the user profile, a meta information storing means for storing meta information that has been selected and received, a meta information operating means for searching and/or browsing meta information, an inference rule storing means for storing an inference rule about the data structure of meta information, a changing means for changing the structure of the meta information schema that has been stored in the meta information schema storing means and the meta information that has been stored in the meta information storing means corresponding to the user profile that has been stored in the user profile storing means and to the inference rule that has been stored in the inference rule storing means, a data storing means for receiving and storing data of

contents represented by the selected meta information, and a data operating portion for operating data that has been stored in the data storing means.

According to the invention of claim 7, an inference rule is used. In addition, when the use frequency of an inference rule becomes high or corresponding to a user's setup, the structure of a meta information schema and meta information are changed so that a new attribute is defined corresponding to the inference rule. Thus, the searching efficiency can be improved.

The invention of claim 10 is a transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving apparatus for receiving digital contents, wherein the transmitting apparatus comprises a meta information storing means for storing meta information about data that is transmitted, a meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted, an inference rule storing means for storing an inference rule about the data structure of meta information about data that is transmitted, and a transmitting means for transmitting the meta information, the meta information schema, the inference rule, and contents data through a transmission path, and wherein the receiving apparatus

comprises a receiving means for receiving the meta information, the meta information schema, the inference rule, and contents data through a transmission path, a meta information schema storing means for storing the received meta information schema, a profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema, a user profile storing means for storing a user profile generated by the profile operating means, a meta information filtering means for selecting and receiving meta information corresponding to the user profile, a meta information storing means for storing the meta information that has been selected and received, a meta information operating means for searching and/or browsing meta information, an inference rule storing means for storing an inference rule that has been received, a data storing means for receiving and storing data of contents that is represented by the selected meta information, and a data operating portion for operating data that has been stored in the data storing means.

According to the invention of claim 10, with an inference rule, the data amount of meta information to be transmitted can be reduced.

The invention of claim 11 is a transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving

apparatus for receiving digital contents, wherein the transmitting apparatus comprises a meta information storing means for storing meta information about data that is transmitted, a meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted, a transmitting means for transmitting the meta information, the meta information schema, and contents data through a transmission path, a communication controlling means for communicating with the receiving apparatus, and a changing means for changing the structure of the meta information schema that has been stored in the meta information storing means and the meta information that has been stored in the meta information storing means corresponding to data that has been received through the communication controlling means, and wherein the receiving apparatus comprises a receiving means for receiving the meta information, the meta information schema, and contents data through a transmission path, a meta information schema storing means for storing the meta information schema that has been received, a profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema, a user profile storing means for storing a user profile generated by the profile operating means, a meta information filtering means for selecting and

receiving meta information corresponding to the user
profile, a meta information storing means for storing
meta information that has been selected and received, a
meta information operating means for searching and/or
5 browsing meta information, a data storing means for
receiving and storing data of contents represented by
the meta information that has been selected, a data
operating portion for operating data that has been
stored in the data storing means, and a communication
10 controlling means for transmitting data to the
transmitting apparatus.

According to the invention of claim 11, the
transmitting apparatus is informed of a meta
information use history, for example, the applied
15 frequency of a meta information schema on the receiving
side. Thus, a meta information schema transmitted from
the transmitting apparatus is changed. In other words,
an attribute whose applied frequency is low is deleted
or the transmission thereof becomes unnecessary. Thus,
20 the data amount of a meta information schema to be
transmitted can be reduced.

The invention of claim 12 is a transmitting
and receiving apparatus having a transmitting apparatus
for providing digital contents and a receiving
25 apparatus for receiving digital contents, wherein the
transmitting apparatus comprises a meta information
storing means for storing meta information about data

that is transmitted, a meta information storing means
for storing a meta information schema that defines the
data structure of meta information about data that is
transmitted, an inference rule storing means for
5 storing an inference rule about the data structure of
meta information about data that is transmitted, a
transmitting means for transmitting the meta
information, the meta information schema, the inference
rule, and contents data through a transmission path, a
10 communication controlling means for communicating with
the receiving apparatus, and a changing means for
changing the inference rule that has been stored in the
inference rule storing means corresponding to data that
has been received through the communication controlling
15 means, and wherein the receiving apparatus comprises a
receiving means for receiving the meta information, the
meta information schema, the inference rule, and
contents data through a transmission path, a meta
information schema storing means for storing the meta
20 information schema that has been received, a profile
operating means for operating a selection criterion for
selecting meta information corresponding to the meta
information schema, a user profile storing means for
storing a user profile generated by the profile
25 operating means, a meta information filtering means for
selecting and receiving meta information corresponding
to the user profile, a meta information storing means

for storing the meta information that has been selected and received, a meta information operating means for searching and/or browsing meta information, an inference rule storing means for storing the inference rule that has been received, a data storing means for receiving and storing data of contents represented by the meta information that has been selected, a data operating portion for operating data that has been stored in the data storing means, and a communication controlling means for transmitting data to the transmitting apparatus.

According to the invention of claim 12, the transmitting apparatus is informed of a meta information use history, for example, the applied frequency of an inference rule on the receiving side. Thus, an inference rule transmitted from the transmitting apparatus is changed. In other words, an inference rule whose applied frequency is low is deleted or the transmission thereof becomes unnecessary. Thus, the data amount of an inference rule to be transmitted can be reduced.

The invention of claim 13 is a transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving apparatus for receiving digital contents, wherein the transmitting apparatus comprises a meta information storing means for storing meta information about data

that is transmitted, a meta information schema storing
means for storing a meta information schema that
defines the data structure of meta information about
data that is transmitted, an inference rule storing
5 means for storing an inference rule about the data
structure of meta information about data that is
transmitted, and a transmitting means for transmitting
the meta information, the meta information schema, the
inference rule, and contents data through a
10 transmission path, and wherein the receiving apparatus
comprises a receiving means for receiving the meta
information, the meta information schema, the inference
rule, and contents data through a transmission path, a
meta information schema storing means for storing the
15 meta information schema that has been received, a
profile operating means for operating a selection
criterion for selecting meta information corresponding
to the meta information schema, a user profile storing
means for storing a user profile generated by the
20 profile operating means, a meta information filtering
means for selecting and receiving meta information
corresponding to the user profile, a meta information
storing means for storing the meta information that has
been selected and received, a meta information
25 operating means for searching and/or browsing meta
information, an inference rule storing means for
storing an inference rule, a changing means for

changing the structure of the meta information schema that has been stored in the meta information schema storing means and the meta information that has been stored in the meta information storing means
5 corresponding to the user profile that has been stored in the user profile storing means and to the inference rule that has been stored in the inference rule storing means, a data storing means for receiving and storing data of contents represented by the meta information that has been selected, and a data operating portion for operating data stored in the data storing means.

According to the invention of claim 13, an inference rule is used. In addition, when the use frequency of the inference rule becomes high or
15 corresponding to a user's setup, the structure of a meta information schema and meta information are changed so that a new attribute is defined corresponding to the inference rule. Thus, the searching efficiency can be improved.

The invention of claim 14 is a transmitting method for providing digital contents, comprising the step of when meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, and contents
25 data are transmitted through a transmission path, changing the structure of the meta information schema and the meta information corresponding to data that has

been received from a receiving apparatus and transmitting the changed data.

According to the invention of claim 14, the transmitting apparatus is informed of a meta information use history, for example, the applied frequency of a meta information schema on the receiving side. Thus, a meta information schema transmitted from the transmitting apparatus is changed. In other words, an attribute whose applied frequency is low is deleted or the transmission thereof becomes unnecessary. Thus, the data amount of a meta information schema to be transmitted can be reduced.

The invention of claim 15 is a transmitting method for providing digital contents, comprising the Step of when meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, an inference rule about the data structure of the meta information, and contents data are transmitted through a transmission path, changing the inference rule corresponding to data that has been received from a receiving apparatus and transmitting the changed data.

According to the invention of claim 15, the transmitting apparatus is informed of a meta information use history, for example, the applied frequency of an inference rule on the receiving side. Thus, an inference rule transmitted from the

transmitting apparatus is changed. In other words, an inference rule whose applied frequency is low is deleted or the transmission thereof becomes unnecessary. Thus, the data amount of an inference rule to be transmitted can be reduced.

The invention of claim 17 is a receiving method for receiving data for providing digital contents, comprising the steps of storing a meta information schema that defines the data structure of meta information, storing meta information that has been selected and received, searching and/or browsing meta information, and changing the structure of the meta information schema and the meta information that has been stored corresponding to a user profile and an inference rule.

According to the invention of claim 17, an inference rule is used. In addition, when the use frequency of the inference rule becomes high or corresponding to a user's setup, the structure of a meta information schema and meta information are changed so that a new attribute is defined corresponding to the inference rule. Thus, the searching efficiency can be improved.

The invention of claim 18 is a transmitting and receiving method for providing digital contents and receiving digital contents, comprising the steps of transmitting meta information about data that is

transmitted, a meta information schema that defines the data structure of the meta information, and contents data through a transmission path, changing the structure of the meta information schema that is transmitted and the meta information corresponding to data that has been received from a receiving apparatus, storing a meta information schema that defines the data structure of the meta information that has been received on a receiving side, storing the meta information that has been selected and received, and searching and/or browsing the meta information.

According to the invention of claim 18, the transmitting apparatus is informed of a meta information use history, for example, the applied frequency of a meta information schema on the receiving side. Thus, a meta information schema transmitted from the transmitting apparatus is changed. In other words, a meta information schema whose applied frequency is low is deleted or the transmission thereof becomes unnecessary. Thus, the data amount of a meta information schema to be transmitted can be reduced.

The invention of claim 19 is a transmitting and receiving method for providing digital contents and receiving digital contents, comprising the steps of transmitting meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, an inference

rule, and contents data through a transmission path,
changing the inference rule that is transmitted
corresponding to data that has been received from a
receiving apparatus, storing a meta information schema
5 that defines the data structure of the meta information
that has been received on a receiving side, storing the
meta information that has been selected and received,
and searching and/or browsing the meta information.

According to the invention of claim 19, the
10 transmitting apparatus is informed of a meta
information use history, for example, the applied
frequency of an inference rule on the receiving side.
Thus, an inference rule transmitted from the
transmitting apparatus is changed. In other words, an
15 inference rule whose applied frequency is low is
deleted or the transmission thereof becomes
unnecessary. Thus, the data amount of an inference
rule to be transmitted can be reduced.

The invention of claim 20 is a transmitting
20 and receiving method for providing digital contents and
receiving digital contents, comprising the steps of
transmitting meta information about data that is
transmitted, a meta information schema that defines the
data structure of the meta information, an inference
25 rule about the data structure of the meta information,
and contents data through a transmission path, storing
the meta information schema that defines the data

structure of the meta information that has been received on a receiving side, storing the meta information that has been selected and received, and changing the structure of the meta information schema and the meta information that has been stored corresponding to a user profile and the inference rule.

According to the invention of claim 20, an inference rule is used. In addition, when the use frequency of the inference rule becomes high or corresponding to a user's setup, the structure of a meta information schema and meta information are changed so that a new attribute is defined corresponding to the inference rule. Thus, the searching efficiency can be improved.

Brief Description of Drawings

Fig. 1 is a block diagram showing a communication system according to the present invention; Fig. 2 is a block diagram showing an example of a broadcasting station according to an embodiment of the present invention; Fig. 3 is a block diagram showing an example of a receiving terminal apparatus according to the embodiment of the present invention; Fig. 4 is a schematic diagram for explaining a stream according to the embodiment of the present invention; Fig. 5 is a schematic diagram showing an example of a meta information schema according to the embodiment of the present invention; Fig. 6 is a schematic diagram

showing an example of meta information according to the
embodiment of the present invention; Fig. 7 is a
schematic diagram showing an example of inference rules
according to the embodiment of the present invention;
5 Fig. 8 is a schematic diagram showing an example of a
meta information operation using inference rules
according to the embodiment of the present invention;
Fig. 9 is a schematic diagram showing an example of a
search input screen according to the embodiment of the
10 present invention; Fig. 10 is a flow chart for
explaining a process according to the embodiment of the
present invention; Fig. 11 is a flow chart for
explaining a process according to the embodiment of the
present invention; Fig. 12 is a flow chart for
15 explaining a process according to the embodiment of the
present invention; Fig. 13 is a schematic diagram
showing an example of a meta information changing
process according to the embodiment of the present
invention; Fig. 14 is a schematic diagram showing
20 another example of a meta information schema according
to the embodiment of the present invention; Fig. 15 is
a schematic diagram showing another example of meta
information according to the embodiment of the present
invention; Fig. 16 is a schematic diagram showing
25 another example of inference rules according to the
embodiment of the present invention; Fig. 17 is a
schematic diagram showing an example of a meta

information schema that has been changed according to the embodiment of the present invention; Fig. 18 is a schematic diagram showing an example of meta information that has been changed according to the embodiment of the present invention; Fig. 19 is a block diagram showing an example of a broadcasting station according to another embodiment of the present invention; Fig. 20 is a block diagram showing an example of a receiving terminal apparatus according to the other embodiment of the present invention; Fig. 21 is a flow chart for explaining a process according to the other embodiment of the present invention; Fig. 22 is a flow chart for explaining a process according to the other embodiment of the present invention; and Fig. 23 is a schematic diagram for explaining an example of a meta information changing process according to the other embodiment of the present invention.

Best Modes for Carrying out the Invention

Next, an embodiment of the present invention will be described. Fig. 1 shows an example of the structure of a digital contents delivering system according to the present invention. Information providers 101a and 101b each have a database that stores contents data, a meta information schema that defines the structure of meta information about the contents data, and meta information about each title of the contents data. An example of contents data is a

WWW page. The information providers 101a and 101b are connected to a broadcasting station 102 and receiving terminal apparatuses 103a and 103b through a bidirectional network 105. The information providers 101a and 101b can deliver contents data, a meta information schema, and meta information to the receiving terminal apparatuses 103a and 103b through the bidirectional network 105. Likewise, the broadcasting station 102 has a database that stores contents data, a meta information schema that defines the structure of meta information about the contents data, and meta information of each title of the contents data. An example of the contents data is a program that is broadcast. The broadcasting station 102 is connected to the receiving terminal apparatuses 103a and 103b through a broadcasting network 104. The broadcasting station 102 broadcast contents data, a meta information schema, and meta information to the receiving terminal apparatuses 103a and 103b through the broadcasting network 104. In addition, the broadcasting station 102 can receive contents data, a meta information schema, and meta information from the information providers 101a and 101b through the bidirectional network and then broadcast them to the receiving terminal apparatuses 103a and 103b through the broadcasting network 104.

Fig. 2 shows an example of the structure of

the broadcasting station 102. A data storing portion 204 stores contents data that is broadcast to the receiving terminal apparatuses 103a and 103b. The data storing portion 204 may temporarily store contents data provided by the information providers 101a and 101b. When contents data that is created is delivered without a delay as with a live program, the data storing portion 204 may be a cache that temporarily stores contents data that is monitored.

A meta information schema storing portion 202 stores a meta information schema that defines the structure of meta information about contents data stored in the data storing portion 204. The meta information is information that is added to contents data and broadcast to each receiving terminal apparatus. When contents data is a television program, meta information for example "program title", "program genre", and "parental guide" is added to the contents data. When contents data is a data broadcast, meta information for example "program name", "program genre", and "applicable OS type" is added to the contents data.

A meta information schema defines the structure of meta information added to contents data. There are a plurality of meta information schemas because the structure of meta information added to contents data varies corresponding thereto and time

after time. The plurality of meta information schemas are identified with a meta information schema identifier. In addition, when necessary, a meta information schema, which represents the structure of meta information, may be transmitted to each receiving terminal apparatus through the bidirectional network or the broadcasting network before meta information is transmitted so that the meta information schema can be updated.

10 A meta information storing portion 203 stores meta information about contents data stored in the data storing portion 204 corresponding to the structure of the meta information schema stored in the meta information schema storing portion 202. For example, 15 as meta information about a particular program, "program title: seven o'clock news", "program genre: news", and "broadcast time: 7:00 to 7:30" are added. An identifier of a meta information schema of the meta information is also added to the contents data.

20 An inference rule generating and storing portion 201 generates an inference rule corresponding to the structure of a meta information schema. With an inference rule, when meta information is searched and/or browsed, data that is not represented as an 25 attribute value of meta information can be processed. An inference rule converting portion 205 converts the format of a generated inference rule into a

predetermined transmission format. Various types of transmission formats may be used. In this example, the MPEG system session format is used.

5 A meta information schema converting portion 206 converts the format of a meta information schema stored in the meta information schema storing portion 202 into a predetermined transmission format. The descriptive format of a schema stored in the meta information schema storing portion 202 may vary for each title of contents data or each information provider. However, the meta information schema converting portion 206 converts the format of a meta information schema into a predetermined transmission format. As the transmission format, various types may be used. For example, data can be represented in the MPEG system section format.

10 A meta information converting portion 207 converts the format of meta information stored in the meta information storing portion 203 into a predetermined transmission format. The descriptive format of meta information may vary for each title of contents data or each information provider. As the transmission format, various types may be used. As an example, data may be represented in the MPEG system section format.

20 A transmitting portion 208 multiplexes an inference rule, a meta information schema, meta

information that have been converted in the transmission format by the inference rule converting portion 205, the meta information schema converting portion 206, and the meta information converting portion 207 with contents data stored in the data storing portion 204. The transmitting portion 208 transmits the multiplexed data to the broadcasting network 104. The broadcasting network 104 is for example a line corresponding to the MPEG-2 system or the IP multi-cast.

A communication controlling portion 210 is connected to the bidirectional network 105. The communication controlling portion 210 receives requests for an inference rule, a meta information schema, meta information, and contents data from the receiving terminal apparatuses 103a and 103b. The communication controlling portion 210 obtains the inference rule, the meta information schema, the meta information, and the contents data corresponding to the requests from a predetermined portion and transmits them to the receiving terminal apparatuses 103a and 103b. The bidirectional network 105 is for example a line corresponding to IP (Internet Protocol), ATM (Asynchronous Transfer Mode), or the like. The structure of each of the information providers 101a and 101b is the same as the structure of the broadcasting station 102 except that the former does not have a

transmitting portion that transmits data to the
broadcasting network.

Fig. 3 shows an example of the structure of
each of the receiving terminal apparatuses 103a and
103b. A receiving portion 301 receives an inference
rule, a meta information schema, meta information, and
contents data that are transmitted through the
broadcasting network 104.

The received inference rule is stored in an
inference rule storing portion 304. The received meta
information schema is stored in a meta information
schema storing portion 307. In addition, the meta
information schema stored in the meta information
schema storing portion 307 is occasionally changed by a
meta information / schema changing portion 308.

The user of each receiving terminal apparatus
references a meta information schema stored in the meta
information schema storing portion 307 through a
profile operating portion 311. A profile input screen
corresponding to the meta information schema is
displayed on a displaying portion 313 or another
displaying portion. The user inputs his or her desired
profile with the profile operating portion 311. As a
result, user's profile information is generated. The
generated profile information is stored in a user
profile storing portion 312.

The received meta information is supplied to

a meta information filter 303. The meta information filter 303 selects meta information that satisfies conditions of the selected user profile information stored in the user profile storing portion 312. The selected meta information is stored to a meta information storing portion 306. The meta information stored in the meta information storing portion 306 is occasionally changed by the meta information / schema changing portion 308.

A searching operation, a browsing operation, and so forth are performed for meta information stored in the meta information storing portion 306 through a meta information operating portion 310. A meta information input screen for searching meta information and searched meta information are displayed on the displaying portion 313 or another displaying portion. The searched meta information history and/or browsed meta information history is stored in the user profile storing portion 312. The searched meta information history and/or browsed meta information history affects the change processing method of the meta information / schema changing portion 308.

Corresponding to meta information stored in the meta information storing portion 306, contents data corresponding to the meta information is received by the receiving portion 301 and stored to a data storing portion 305. Contents data is displayed on the

displaying portion 313 corresponding to a request that is received from a data operating portion 309. An inference rule, a meta information schema, meta information, and contents data may be requested and received by a communication controlling portion 302 through the bidirectional network 105.

As with the case that a meta information schema and an inference rule are pre-stored in a memory such as a non-volatile memory of a receiving apparatus, when it can be assumed that they are pre-stored in the receiving apparatus, it is not necessary to transmit a meta information schema and an inference rule, but meta information and contents data.

Next, the embodiment of the present invention will be further described. Fig. 4 shows an example of contents data, a meta information schema, meta information, and an inference rule that are delivered by for example a digital broadcast. In Fig. 4, as an example, contents data 401 as a program (a baseball game of Kyojin vs. Hanshin) that chronologically succeeds is shown. An identifier StreamID#1 is assigned to the entire program (hereinafter referred to as baseball game segment) 402. Identifiers StreamID#100 and StreamID#101 are assigned to part of the contents data, for example, the first half and the second half of one inning of the baseball game (hereinafter, one inning is referred to as inning

segment).

In addition to the above-described identifier StreamID, any portion of successive data can be identified with parameters that are data composed of start time and duration (not shown). These time data is defined in an MPEG-2 stream.

Fig. 5 shows a meta information schema that defines a data structure representing a baseball game. In Fig. 5, reference numeral 501 represents the data structure of a baseball game segment as a whole. The baseball segment has attributes that are an attribute "date and time of game" 502, an attribute "team name of home team" 503, and an attribute "team name of visitor team" 504. In Fig. 5, reference numeral 505 represents the data structure of each inning segment of the game. Each inning segment has attributes that are an attribute "information representing game" 506, an attribute "inning number" 507, and an attribute "distinguishment of first half or second half" 508. In at least one service, the data structure defined with the meta information schema shown in Fig. 5 is data common in all the description of a baseball game.

Fig. 6 shows an example of meta information. The meta information is a description of information about a particular baseball game. The description of meta information corresponds to a data structure defined by a meta information schema. In Fig. 6, meta

information 601, 605, and 606 corresponding to the baseball game segment 402 (StreamID#1), the inning segment 403 (StreamID#100), and the inning segment 404 (StreamID#101) are shown, respectively. The meta information 601 is a description of meta information of the baseball game segment 402 of "baseball game of Kyojin vs. Hanshin on October 10, 1998". Corresponding to the data structure of the meta information schema 501, the attribute "date and time of game" 502, the attribute "team name of home team" 503, the attribute "team name of visitor team" 504, and their attribute values 602, 603, and 604 are described.

Likewise, meta information 605 and 606 of the inning segment 403 (StreamID#100) and the inning segment 404 (StreamID#101) are described as shown in Fig. 6. In the example shown in Fig. 6, the home team is Kyojin, whereas the visitor team is Hanshin. StreamID#100 is the first half of the third inning, whereas StreamID#101 is the second half of the third inning.

Fig. 7 shows inference rules. An inference rule defines a rule for which an attribute value is newly obtained from the relation between segments. In Fig. 7, reference numeral 701 is a rule for which an attribute value of the attribute "date and time of game" of the inning segment is obtained. The attribute "date and time" of the inning segment defines an

inference rule 701 of which the attribute "date and time" of the inning segment is obtained from the attribute "date and time" of the baseball game segment. Inference rules 702 and 703 define the relation between a particular inning segment and offending teams. When the attribute "distinguishment of first half or second half" of the inning segment is the first half, the inference rule 702 represents that the visitor team is offending. When the attribute "distinguishment of first half or second half" of the inning segment is the second half, the inference rule 703 represents that the home team is offending.

Fig. 8 shows an example of a meta information operation using inference rules. The user searches and/or browses meta information stored in the meta information storing portion 306 through the meta information operating portion 310. Fig. 8 shows the case that the user has input a command 801 for searching and/or browsing (reproducing) an inning segment of which the offending team is Hanshin.

When a scene search menu is selected, as shown in Fig. 9, a user interface screen 901 that shows attributes to be searched is displayed on a part of the displaying portion 313 or another displaying unit under the control of the memory information operating portion 310. When an inning segment of which Hanshin is offending is searched and reproduced, after an "inning"

tab is selected, an attribute "offending" (icon) 903 and an attribute "Hanshin" (icon) 904 are successively selected by moving a cursor 902 and performing a clicking operation. Thereafter, a "SEARCH" button is pressed. In such a manner, a command 801 for searching and/or browsing (reproducing) an inning segment of which the offending team is Hanshin is input.

Since the visitor attribute of meta information is "Hanshin", an inference rule 702 causes an inferring process (pattern matching process) to be performed. This operation is referred to as unification. Thus, it is clear that as denoted by reference numeral 803, the value of variable @s is a baseball game segment represented by StreamID#1. Thus, an inferring process 804 is performed. Corresponding to the attribute "distinguishment of first half or second half" of the meta information 605, variable @inning becomes StreamID#100 as denoted by 805. Thus, it is determined that the result of the user's inquiry is "StreamID#100". The receiving terminal apparatus shown in Fig. 3 reproduces the inning segment 403 (StreamID#100) on the displaying portion 313. In this case, while the displaying portion 313 is reproducing particular contents data, its child screen may display the inning segment 403.

As another example of the searching operation using inference rules, an offending team name of the

inning segment 403 (StreamID#100) may be searched. Since the attribute "distinguishment of first half or second half" of meta information 605 of the inning segment 403 is "first half", the unification is performed with the inference rule 702. Thus, it is clear that the value of variable @s is StreamID#1. In addition, as a result of the inferring process, it is clear that the offending team name is "Hanshin".

As was described above, an attribute value of meta information that is not explicitly represented can be processed using an inference rule. According to the embodiment of the present invention, using inference rules, the number of attributes of meta information can be reduced. Thus, the increase of data amount of meta information can be suppressed. As a result, the transmission efficiency can be improved. In other words, using inference rules, the minimally required amount of meta information is transmitted. The other required meta information is obtained using inference rules by the receiving terminal apparatus. Thus, the transmission efficiency can be improved.

Next, the embodiment of the present invention will be further described. The history of meta information searched by the meta information operating portion 310 is stored to the user profile storing portion 312. As a format of which the search history of meta information is stored to the user profile

storing portion 312, an identifier of an inference rule applied in the meta information operation and the frequency thereof are stored as a pair.

Fig. 10 is a flow chart showing a process for storing a search history to the user profile storing portion 312. At step S1, it is determined whether or not a received inference rule has been stored to the inference rule storing portion 304. When the received inference rule has been stored to the inference rule storing portion 304, the flow advances to step S2. At step S2, the frequency $\text{Freq}(i)$ of the rule applied for the inference rule number i stored in the user profile storing portion 312 is initialized ($\text{Freq}(i) = 0$). The inference rule number i is a number assigned to each inference rule.

The meta information operation performed by the user with the meta information operating portion 310, in reality, a meta information searching process, is shown in Fig. 11. At step S11, a meta information operation is performed. Thereafter, the flow advances to step S12. At step S12, it is determined whether or not an inference rule has been applied for a searching process as described with reference to Fig. 8. When an inference rule has not been applied, the flow returns to step S11.

When an inference rule has been applied, the frequency $\text{Freq}(i)$ applied for the inference rule number

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i is incremented by +1 (at step S13). At step S14, it is determined whether or not the applied frequency $\text{Freq}(i)$ is larger than a threshold value T. The threshold value T is a predetermined value. When the relation of $(\text{Freq}(i) \leq T)$ is satisfied, the flow returns to step S11. When the relation of $(\text{Freq}(i) > T)$ is satisfied, the flow advances to step S15. At step S15, a meta information - schema changing process is performed.

Fig. 12 shows the meta information - schema changing process performed by the meta information / schema changing portion 308. At step S21, the user profile storing portion 312 informs the meta information / schema changing portion 308 that $\text{Freq}(i)$ is larger than the threshold value T. Thus, the meta information / schema changing portion 308 appends the left side of an inference rule of which the applied frequency is larger than the threshold value to the meta information schema. The left side of an inference rule represents an item to be inferred. Thus, the left side of an inference rule is a new attribute of a particular information structure.

In the inference rule 701 shown in Fig. 7, "date and time" of an inning segment is defined as a left side. In the inference rules 702 and 703, offending teams (visitor team and home team) are defined as left sides of the inference rules. At step

S21, the attribute is appended as a new attribute to the meta information schema. As an attribute is appended to the meta information schema, the attribute value of the meta information corresponding to the meta information schema is newly obtained (at step S22).

Next, an example of the meta information - schema changing process will be described with reference to Fig. 13. When it has been determined that the applied frequency $\text{Freq}(i)$ of each of the inference rules 702 and 703 is larger than the threshold value T , a new attribute "offending: team name" is appended to the inning structure of the meta information schema (at step S21). Reference numeral 1301 represents the meta information schema to which the attribute has been appended. The meta information schema is stored to the meta information schema storing portion 306.

As a new attribute has been appended to the meta information schema, an attribute of "offending" is also appended to the meta information of the inning segment (StreamID#100) and the attribute value is obtained (at step S22). Reference numeral 1302 represents meta information that has been changed. An attribute of "offending" is also appended to meta information of the inning segment (StreamID#101) and the attribute value is obtained (at step S22). Reference numeral 1303 represents meta information that has been changed. The attribute value of the meta

information is stored to the meta information storing portion 306.

After the changing process has been performed, whenever the searching process is performed, it is not necessary to apply the inference rules 702 and 703. Instead, the values of the attributes of "offending" can be directly obtained from the meta information 1302 and 1303. In the case that the applied frequencies of the inference rules 702 and 703 are high, when the attribute values are stored to the meta information storing portion 306, the searching efficiency can be improved.

In the above-described meta information schema - meta information changing process, the information stored in the meta information schema storing portion 307 and the meta information storing portion 306 is changed corresponding to the search history with the meta information operating portion 310. Alternatively, before information is stored to the meta information schema storing portion 307 and the meta information storing portion 306, the information may be changed.

Figs. 14 to 18 shows another example of the meta information schema - meta information changing process. As was described in the above example, the meta information schema - meta information changing process is not always executed when the applied

frequency of an inference rule is larger than the threshold value. In the other example, a meta information schema and meta information are changed corresponding to a user's setup.

Fig. 14 shows examples of meta information schemas of a news program and a movie. The meta information schema of the news program has attributes that are for example an attribute "program name" and an attribute "announcer name". The meta information schema of the news program has attributes that are for example an attribute "title name" and an attribute "actor name". Fig. 15 shows examples of meta information created corresponding to the meta information schemas. In Fig. 15, attribute values of the attributes of the news program and the movie are shown.

Fig. 16 shows two inference rules 1601 and 1602. The inference rules 1601 and 1602 are inference rules for obtaining attributes "performer". In other words, the inference rule 1601 represents that the attribute "announcer" of the news is synonym with an attribute "performer". The inference rule 1602 represents that the attribute "actor" of the movie is synonymous with an attribute "performer".

It may be more preferred for a particular user to treat attributes "announcer" and "actor" as an attribute "performer" rather than distinguishing them.

Thus, the user designates an attribute "performer" as a new attribute through the user profile operating portion 311.

As a result of which the user has designated a new attribute, the meta information schemas shown in Fig. 14 are changed to meta information schemas shown in Fig. 17. The attributes "announcer" and "actor" of the original meta information schemas are changed to the attributes "performer" of the new meta information schemas. The meta information schemas that have been changed are stored to the meta information schema storing portion 307.

In addition, the meta information shown in Fig. 15 is changed to meta information shown in Fig. 18. Although the meta information shown in Fig. 15 is received, when it is stored to the meta information storing portion 306, meta information converted as shown in Fig. 18 is stored. In other words, the attribute values of the attributes "announcer" and "actor" of the original meta information are changed to the attribute values of the attributes "performer".

Next, another embodiment (hereinafter referred to as second embodiment) of the present invention will be described. In the above-described embodiment (hereinafter referred to as first embodiment), the receiving terminal apparatus changes a meta information schema and meta information. On the

other hand, according to the second embodiment of the present invention, with reference to information transmitted from a receiving terminal apparatus, the transmitting side (for example, a broadcasting station) changes a meta information schema and meta information. In the second embodiment, unlike with the first embodiment, a meta information schema and attributes of meta information that are transmitted can be prevented from being different from those of the receiving terminal apparatus.

Fig. 19 shows the structure of a broadcasting station 102 according to the second embodiment of the present invention. For simplicity, in Fig. 19, similar portions to those of the broadcasting station 102 of the first embodiment shown in Fig. 2 are denoted by similar reference numerals and their description is omitted. In the second embodiment, a communication controlling portion 210 receives meta information use histories from receiving terminal apparatuses 103a and 103b through a bidirectional network 105.

Corresponding to the received meta information use histories, a meta information changing portion 211, a meta information schema changing portion 212, and an inference rule changing portion 213 change information stored in a meta information storing portion 203, a meta information schema storing portion 202, and an inference rule generating - storing portion

201, respectively.

Fig. 20 shows the structure of the receiving terminal apparatus 103a (or 103b) according to the second embodiment of the present invention. For simplicity, in Fig. 20, the structural portions similar to those of the receiving terminal apparatus according to the first embodiment (see Fig. 3) are denoted by similar reference numerals and their description is omitted. In the second embodiment, the meta information / schema changing portion is not disposed. The history of the searching and/or browsing operation performed by a meta information operating portion 310 is stored to a user profile storing portion 312. The history of the searching and/or browsing operation is transmitted by a communication controlling portion 302 to a broadcasting station 102 as a transmitting apparatus through a bidirectional network 105.

In the second embodiment, as with the first embodiment, a meta information operation can be performed. For example, as shown in Fig. 5, a meta information schema is described and meta information corresponding thereto is described as shown in Fig. 6. The meta information operating portion 310 searches and/or browses meta information stored in a meta information storing portion 306. When meta information is searched, with inference rules shown in Fig. 7, attribute values of meta information that are not

explicitly represented are obtained as new attribute values as shown in Fig. 8.

Next, the second embodiment of the present invention will be further described. The history of meta information searched by the meta information operating portion 310 is stored to the user profile storing portion 312. As a format of the search history stored to the user profile storing portion 312, an identifier of an inference rule applied for the meta information operation and the frequency thereof are stored as a pair.

Fig. 21 shows a process for storing the search history to the user profile storing portion 312. The process shown in Fig. 21 is the same as the process according to the first embodiment shown in Fig. 10. After a meta information schema and an inference rule (meta information schema number / inference rule number i) have been received, it is determined whether or not they have been stored to the meta information schema storing portion 307 and the inference rule storing portion 304, respectively (at step S31). When it has been determined they had been stored, the flow advances to step S32. At step S32, the frequency $\text{Freq}(i)$ applied for a rule corresponding to the meta information schema number / inference rule number i stored in the user profile storing portion 312 is initialized ($\text{Freq}(i) = 0$). The meta information schema

number / inference rule number i is a number assigned to each meta information schema / inference rule.

Fig. 22 shows a process for a meta information operation performed by the user with the meta information operating portion 310, in reality, a meta information searching process. When meta information is searched at step S41, an attribute of meta information having the structure corresponding to a particular meta information schema is searched. When an attribute of meta information has been searched, the applied frequency $\text{Freq}(i)$ of the meta information schema number i corresponding to the attribute is incremented by +1 (at steps S42 and S43). When it has been determined that an attribute of meta information had not been referenced, the flow advances to step S44 skipping step S43.

At step S44, it is determined whether or not an inference rule has been applied as described with reference to Fig. 8. When an inference rule has been applied, the applied $\text{Freq}(i)$ corresponding to the inference rule number i is incremented by +1 (at step S45). When an inference rule has not been applied, the flow advances to step S46 skipping step S45. At step S46, the meta information schema / inference rule applied frequency $\text{Freq}(i)$ stored in the user profile storing portion 312 is transmitted as history information to a transmitting apparatus (broadcasting

station). The communication controlling portion 302 transmits the history information periodically or corresponding to a request issued from the transmitting apparatus. When the amount of history information that has been stored exceeds a predetermined value, the communication controlling portion 302 automatically transmits the history information to the transmitting apparatus.

The transmitted history information is received by the communication controlling portion 210 of the transmitting apparatus (broadcasting station 120) through the bidirectional network 105. Corresponding to the received history information, a changing process for a meta information schema and an inference rule is performed. In other words, the meta information schema changing portion 212 deletes attributes whose applied frequencies are low from those of the meta information schema stored in the meta information schema storing portion 202 or prevents them from being added to transmission data. On the other hand, the meta information changing portion 211 deletes meta information corresponding to attributes that are deleted from those of meta information stored in the meta information storing portion 203 or meta information corresponding to attributes that are not added to the transmission data or prevents them from being added to the transmission data. As with a meta

information schema, the inference rule changing portion 213 performs a deleting process or a transmission preventing process for inference rules whose applied frequencies are low in those stored in the inference rule generating and storing portion 201. Thus, it is not necessary to transmit unnecessary meta information and inference rules. Consequently, the transmission efficiency can be improved.

In addition, the inference rule changing portion 213 applies inference rules whose applied frequencies are high in those stored in the inference rule generating and storing portion 201 to a meta information schema so as to change the structure of the meta information schema. As the structure of the meta information schema is changed, the meta information is also changed.

Next, the above-described changing process will be further described with reference to Fig. 23. As a result of meta information searched by the user, if the frequency of which the attribute value of the attribute "distinguishment of first half or second half" is searched in those of the meta information schema is low, the attribute "distinguishment of first half or second half" is deleted from the meta information schema. Thus, the attribute "distinguishment of first half or second half" is not added as meta information. Since a meta information

schema and meta information that have been not frequently used are not transmitted, the transmission efficiency can be improved. When the applied frequencies of the inference rules 702 and 703 are high, they are pre-applied. Thus, the attribute "offending" is added to the meta information schema. Instead, the inference rules 702 and 703 are deleted. Thus, the inference rules can be prevented from being unnecessary transmitted.

As a result, the meta information schema is changed to that as denoted by reference numeral 2301 shown in Fig. 23. After the changing process has been performed, meta information is added corresponding to the structure of the meta information schema 2301 that has been changed. For example, the meta information 1302 and 1303 shown in Fig. 13 are transmitted as meta information 2302 and 2303 shown in Fig. 23. In this case, it is not necessary to transmit the inference rules 702 and 703. Since unnecessary meta information and inference rules are not transmitted, when meta information is searched on the receiving side, it is not necessary to apply inference rules. Thus, the searching efficiency can be improved on the receiving side.

According to the second embodiment, the meta information changing portion 211, the meta information schema changing portion 212, and the inference rule

changing portion 213 changes the meta information structure corresponding to the meta information use history received from a receiving terminal apparatus. As changed results of the individual changing portions, the contents stored in the inference rule storing portion 201, the meta information schema storing portion 202, and the meta information storing portion 203 are changed. As another method for performing the changing process, when the inference rule converting portion 205, the meta information schema converting portion 206, and the meta information converting portion 207 convert respective information into the transmission format, the individual information may be affected by the changed results.

When the meta information converting portion 207 has stored meta information in the data format shown in Fig. 15, if a use history that represents that the user has frequently used an attribute "performer" is obtained, as shown in Fig. 18, meta information is changed. The meta information storing portion 203 may be affected by the changed result. However, in this case, the information stored in the meta information storing portion 203 remains unchanged as shown in Fig. 15. Instead, the meta information converting portion 207 converts meta information into that as shown in Fig. 18. When the meta information storing portion 203 is affected by the changed result, the distinguishment

of "announcer" and "actor" is lost. On the other hand, when the meta information converting portion 207 performs the converting process, the original information is not lost.

5 In the second embodiment of the present invention, the transmission of either meta information or inference rules may be omitted.

10 According to the present invention, since a transmitting apparatus receives a meta information use history from a receiving apparatus of a user and does not transmit meta information and inference rules that are not necessary for the receiving apparatus of the user, the transmission efficiency of meta information and inference rules can be improved on the transmitting
15 apparatus side. On the other hand, since the transmitting apparatus transmits only necessary meta information and inference rules to the receiving apparatus, the searching efficiency of meta information can be improved on the receiving apparatus side.

20 According to the present invention, since the transmitting apparatus transmits inference rules that represent the relation of attributes of meta information schemas to each receiving terminal apparatus along with meta information schemas, when the
25 user searches meta information, he or she can search more complex results with a small amount of data.

 According to the present invention, using

inference rules, the amount of data transmitted as meta information can be reduced. However, when the user searches meta information, since inference rules are applied, the searching efficiency may be lowered. On the other hand, according to the present invention, the applied frequencies of inference rules are obtained from a search history of the user and inference rules with high applied frequencies are applied to stored meta information. The applied meta information is stored. Thus, the searching efficiency can be improved. In addition, corresponding to a user's setup, the searching efficiency can be improved.

CLAIMS

1. A transmitting apparatus for providing digital contents, comprising:

meta information storing means for storing
5 meta information about data that is transmitted;

meta information schema storing means for
storing a meta information schema that defines the data
structure of meta information about data that is
transmitted;

10 inference rule storing means for storing an
inference rule about the data structure of meta
information about data that is transmitted; and

transmitting means for transmitting the meta
information, the meta information schema, the inference
15 rule, and contents data through a transmission path.

2. A transmitting apparatus for providing digital contents, comprising:

meta information storing means for storing
meta information about data that is transmitted;

20 meta information schema storing means for
storing a meta information schema that defines the data
structure of meta information about data that is
transmitted;

transmitting means for transmitting the meta
25 information, the meta information schema, and contents
data through a transmission path;

communication controlling means for

communicating with a receiving apparatus; and

changing means for changing the structure of the meta information schema that has been stored in said meta information schema storing means and the meta information that has been stored in said meta information storing means corresponding to data that has been received through said communication controlling means.

3. A transmitting apparatus for providing digital contents, comprising:

meta information storing means for storing meta information about data that is transmitted;

meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted;

inference rule storing means for storing an inference rule about the data structure of meta information about data that is transmitted;

transmitting means for transmitting the meta information, the inference rule, and contents data through a transmission path;

communication controlling means for communicating with a receiving apparatus; and

changing means for changing the inference rule that has been stored in said inference rule storing means corresponding to data that has been

received through said communication controlling means.

4. The transmitting apparatus as set forth in claim 1, 2, or 3, further comprising:

converting means for converting the format of the meta information into a transmission format.

5. The transmitting apparatus as set forth in claim 2 or 3,

wherein data that has been received through said communication controlling apparatus is data that represents a use history of meta information of the receiving apparatus.

6. A receiving apparatus for receiving data for providing digital contents, comprising:

receiving means for receiving at least meta information and contents data through a transmission path;

meta information schema storing means for storing a meta information schema;

profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema;

user profile storing means for storing a user profile generated by said profile operating means;

meta information filtering means for selecting and receiving meta information corresponding to the user profile;

meta information storing means for storing

meta information that has been selected and received;

meta information operating means for
searching and/or browsing meta information;

5 inference rule storing means for storing an
inference rule about the data structure of meta
information;

data storing means for receiving and storing
data of contents represented by the meta information
that has been selected; and

10 a data operating portion for operating data
that has been stored in said data storing means.

7. A receiving apparatus for receiving data for
providing digital contents data, comprising:

15 receiving means for receiving at least meta
information and contents data through a transmission
path;

meta information schema storing means for
storing a meta information schema that defines the data
structure of meta information;

20 profile operating means for operating a
selection criterion for selecting meta information
corresponding to the meta information schema;

user profile storing means for storing a user
profile generated by said profile operating means;

25 meta information filtering means for
selecting and receiving meta information corresponding
to the user profile;

meta information storing means for storing
meta information that has been selected and received;

meta information operating means for
searching and/or browsing meta information;

5 inference rule storing means for storing an
inference rule about the data structure of meta
information;

changing means for changing the structure of
the meta information schema that has been stored in
10 said meta information schema storing means and the meta
information that has been stored in said meta
information storing means corresponding to the user
profile that has been stored in said user profile
storing means and to the inference rule that has been

15 stored in said inference rule storing means;

data storing means for receiving and storing
data of contents represented by the selected meta
information; and

a data operating portion for operating data
20 that has been stored in said data storing means.

8. The receiving apparatus as set forth in claim
7,

wherein said changing means changes the meta
information schema that has been stored in said meta
25 information schema storing means and the meta
information that has been stored in said meta
information storing means corresponding to a use

history of meta information of a user.

9. The receiving apparatus as set forth in claim
7,

5 wherein said changing means changes a meta
information schema and received meta information
corresponding to a user's setup and stores the changed
meta information schema and the changed meta
information to said meta information schema storing
means and said meta information storing means,
10 respectively.

10. A transmitting and receiving apparatus having
a transmitting apparatus for providing digital contents
and a receiving apparatus for receiving digital
contents,

15 wherein the transmitting apparatus comprises:
meta information storing means for storing
meta information about data that is transmitted;
meta information schema storing means for
storing a meta information schema that defines the data
20 structure of meta information about data that is
transmitted;

inference rule storing means for storing an
inference rule about the data structure of meta
information about data that is transmitted; and

25 transmitting means for transmitting the meta
information, the meta information schema, the inference
rule, and contents data through a transmission path,

and

wherein the receiving apparatus comprises:

receiving means for receiving the meta
information, the meta information schema, the inference
rule, and contents data through a transmission path;

meta information schema storing means for
storing the received meta information schema;

profile operating means for operating a
selection criterion for selecting meta information
corresponding to the meta information schema;

user profile storing means for storing a user
profile generated by said profile operating means;

meta information filtering means for
selecting and receiving meta information corresponding
to the user profile;

meta information storing means for storing
the meta information that has been selected and
received;

meta information operating means for
searching and/or browsing meta information;

inference rule storing means for storing an
inference rule that has been received;

data storing means for receiving and storing
data of contents that is represented by the selected
meta information; and

a data operating portion for operating data
that has been stored in said data storing means.

11. A transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving apparatus for receiving digital contents,

5 wherein the transmitting apparatus comprises:
meta information storing means for storing meta information about data that is transmitted;

meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted;

10 transmitting means for transmitting the meta information, the meta information schema, and contents data through a transmission path;

15 communication controlling means for communicating with the receiving apparatus; and

changing means for changing the structure of the meta information schema that has been stored in said meta information storing means and the meta information that has been stored in said meta information storing means corresponding to data that has been received through said communication controlling means, and

20 wherein the receiving apparatus comprises:

25 receiving means for receiving the meta information, the meta information schema, and contents data through a transmission path;

meta information schema storing means for storing the meta information schema that has been received;

5 profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema;

 user profile storing means for storing a user profile generated by said profile operating means;

10 meta information filtering means for selecting and receiving meta information corresponding to the user profile;

 meta information storing means for storing meta information that has been selected and received;

15 meta information operating means for searching and/or browsing meta information;

 data storing means for receiving and storing data of contents represented by the meta information that has been selected;

20 a data operating portion for operating data that has been stored in said data storing means; and

 communication controlling means for transmitting data to the transmitting apparatus.

12. A transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving apparatus for receiving digital contents,

25 wherein the transmitting apparatus comprises:

meta information storing means for storing
meta information about data that is transmitted;

meta information storing means for storing a
meta information schema that defines the data structure
5 of meta information about data that is transmitted;

inference rule storing means for storing an
inference rule about the data structure of meta
information about data that is transmitted;

transmitting means for transmitting the meta
10 information, the meta information schema, the inference
rule, and contents data through a transmission path;

communication controlling means for
communicating with the receiving apparatus; and

changing means for changing the inference
15 rule that has been stored in said inference rule
storing means corresponding to data that has been
received through said communication controlling means,
and

wherein the receiving apparatus comprises:

20 receiving means for receiving the meta
information, the meta information schema, the inference
rule, and contents data through a transmission path;

meta information schema storing means for
storing the meta information schema that has been
25 received;

profile operating means for operating a
selection criterion for selecting meta information

corresponding to the meta information schema;

user profile storing means for storing a user profile generated by said profile operating means;

meta information filtering means for
5 selecting and receiving meta information corresponding to the user profile;

meta information storing means for storing the meta information that has been selected and received;

10 meta information operating means for searching and/or browsing meta information;

inference rule storing means for storing the inference rule that has been received;

data storing means for receiving and storing
15 data of contents represented by the meta information that has been selected;

a data operating portion for operating data that has been stored in said data storing means; and

communication controlling means for
20 transmitting data to the transmitting apparatus.

13. A transmitting and receiving apparatus having a transmitting apparatus for providing digital contents and a receiving apparatus for receiving digital contents,

25 wherein the transmitting apparatus comprises:
meta information storing means for storing meta information about data that is transmitted;

meta information schema storing means for storing a meta information schema that defines the data structure of meta information about data that is transmitted;

5 inference rule storing means for storing an inference rule about the data structure of meta information about data that is transmitted; and

transmitting means for transmitting the meta information, the meta information schema, the inference rule, and contents data through a transmission path, and

wherein the receiving apparatus comprises:

receiving means for receiving the meta information, the meta information schema, the inference rule, and contents data through a transmission path;

15 meta information schema storing means for storing the meta information schema that has been received;

20 profile operating means for operating a selection criterion for selecting meta information corresponding to the meta information schema;

user profile storing means for storing a user profile generated by said profile operating means;

25 meta information filtering means for selecting and receiving meta information corresponding to the user profile;

meta information storing means for storing

the meta information that has been selected and received;

meta information operating means for searching and/or browsing meta information;

5 inference rule storing means for storing an inference rule;

changing means for changing the structure of the meta information schema that has been stored in said meta information schema storing means and the meta
10 information that has been stored in said meta information storing means corresponding to the user profile that has been stored in said user profile storing means and to the inference rule that has been stored in said inference rule storing means;

15 data storing means for receiving and storing data of contents represented by the meta information that has been selected; and

a data operating portion for operating data stored in said data storing means.

20 14. A transmitting method for providing digital contents, comprising the step of:

when meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, and contents
25 data are transmitted through a transmission path, changing the structure of the meta information schema and the meta information corresponding to data that has

been received from a receiving apparatus and transmitting the changed data.

15. A transmitting method for providing digital contents, comprising the step of:

5 when meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, an inference rule about the data structure of the meta information, and contents data are transmitted through a
10 transmission path, changing the inference rule corresponding to data that has been received from a receiving apparatus and transmitting the changed data.

16. The transmitting method as set forth in claim 14 or 15, further comprising the step of:

15 receiving a meta information use history from the receiving apparatus and transmitting a meta information schema, meta information, and an inference rule that have been changed so that they have respective data structures corresponding to the meta
20 information use history.

17. A receiving method for receiving data for providing digital contents, comprising the steps of:

storing a meta information schema that defines the data structure of meta information;

25 storing meta information that has been selected and received;

searching and/or browsing meta information;

and

changing the structure of the meta
information schema and the meta information that has
been stored corresponding to a user profile and an
inference rule.

18. A transmitting and receiving method for
providing digital contents and receiving digital
contents, comprising the steps of:

transmitting meta information about data that
is transmitted, a meta information schema that defines
the data structure of the meta information, and
contents data through a transmission path;

changing the structure of the meta
information schema that is transmitted and the meta
information corresponding to data that has been
received from a receiving apparatus;

storing a meta information schema that
defines the data structure of the meta information that
has been received on a receiving side;

storing the meta information that has been
selected and received; and

searching and/or browsing the meta
information.

19. A transmitting and receiving method for
providing digital contents and receiving digital
contents, comprising the steps of:

transmitting meta information about data that

is transmitted, a meta information schema that defines the data structure of the meta information, an inference rule, and contents data through a transmission path;

5 changing the inference rule that is transmitted corresponding to data that has been received from a receiving apparatus;

 storing a meta information schema that defines the data structure of the meta information that has been received on a receiving side;

10 storing the meta information that has been selected and received; and

 searching and/or browsing the meta information.

15 20. A transmitting and receiving method for providing digital contents and receiving digital contents, comprising the steps of:

 transmitting meta information about data that is transmitted, a meta information schema that defines the data structure of the meta information, an inference rule about the data structure of the meta information, and contents data through a transmission path;

20 storing the meta information schema that defines the data structure of the meta information that has been received on a receiving side;

25 storing the meta information that has been

selected and received; and

changing the structure of the meta
information schema and the meta information that has
been stored corresponding to a user profile and the
inference rule.

5

ABSTRACT

Along with contents data, a meta information schema, meta information, and inference rules are individually received and stored. A meta information operating portion 310 searches or browses meta information stored in a meta information storing portion 307. The searched and/or browsed history is stored to a user profile storing portion 312. With inference rules, attributes that are not explicitly represented in meta information can be used. When an inference rule whose applied frequency is larger than a predetermined threshold value, a meta information / schema changing portion 308 changes a meta information schema and meta information so that they have an attribute obtained by the inference rule corresponding to the searched and/or browsed history. Thus, since inference rules are not always applied, the searching efficiency can be improved.

Fig. 1

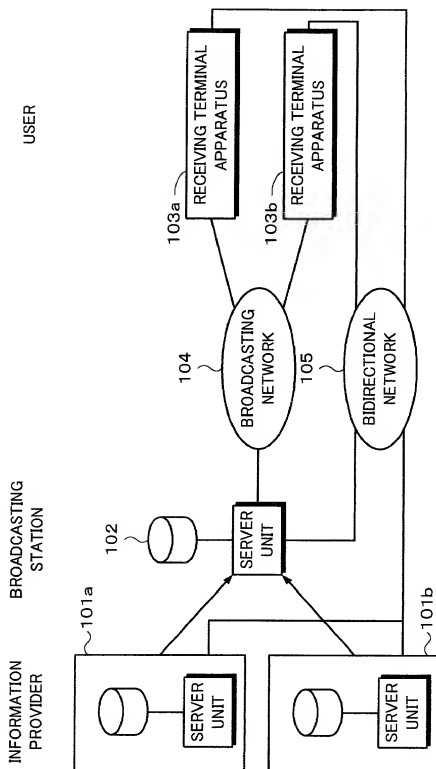


Fig. 2

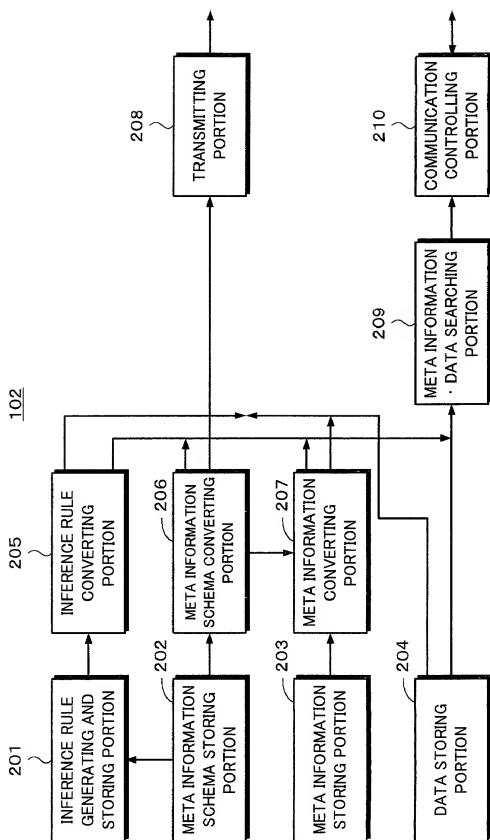


Fig. 3

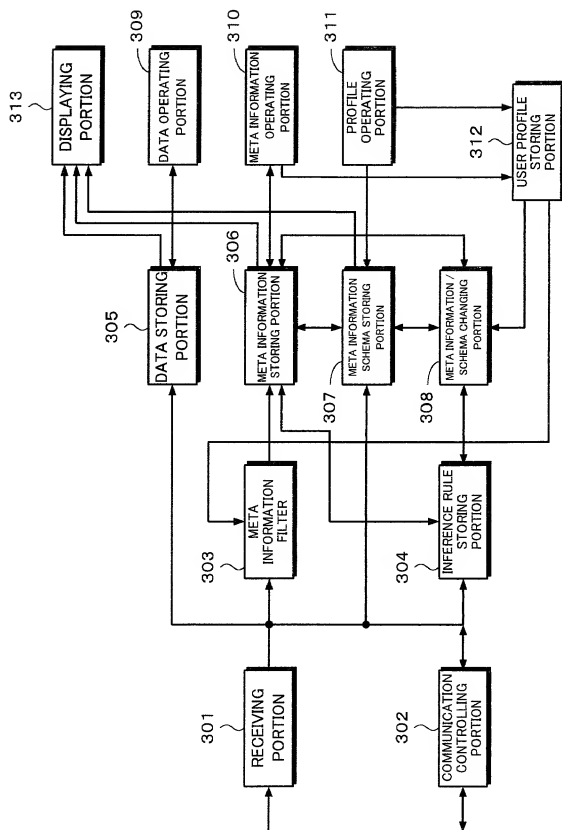


Fig. 4

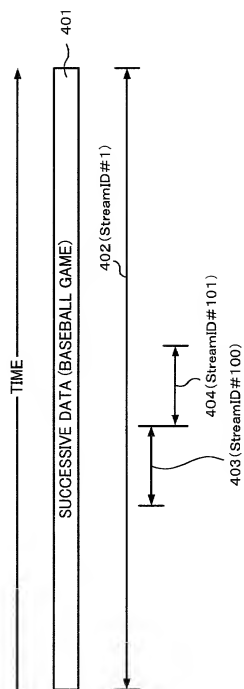


Fig. 5

```

BaseballGame {
    date and time: [date]      ~ 502
    home:           [team name] ~ 503
    visitor:        [team name] ~ 504
}

Inning {
    game:           [BaseballGame] ~ 506
    inning:         [N]             ~ 507
    first half / second half: [first half or second half] ~ 508
}

```

501
505
506

Fig. 6

```

<BaseballGame about="StreamID#1">
    <date and time> 1998/10/10 </date and time> ~ 602
    <home> Kyojin </home> ~ 603
    <visitor> Hanshin </visitor> ~ 604
</BaseballGame>

<Inning ID="StreamID#100">
    <game resource="StreamID#1"/>
    <inning> 3 </inning>
    <first half or second half> first half </first half or second half>
</Inning>

<Inning ID="StreamID#101">
    <game resource="StreamID#1"/>
    <inning> 3 </inning>
    <first half or second half> second half </first half or second half>
</Inning>

```

601
605
606

Fig. 7

```

time and date (@inning, @date) : -
    game (@inning, @s), time and date (@s, @date) ] 701
offending (@inning, @team) : -
    game (@inning, @s), visitor (@s, @team), first half or second half (@inning, "first half"). ] 702
offending (@inning, @team) : -
    game (@inning, @s), home (@s, @team), first half or second half (@inning, "second half"). ] 703

```

Fig. 8

```

offending (@inning, "Hanshin") :- ? ~ 801
game (@inning, @s), visitor (@s, "hanshin"), first half or second half (@inning, "first half") ~ 802
@s = "StreamID#1" ~ 803
game (@inning, @s), visitor ("StreamID#1", "Hanshin"), first half or second half (@inning, "first half") ~ 804
@inning = "StreamID#100" ~ 805

```

Fig. 9

SCENE SEARCH

inning **Batter**

INNING :

FIRST HALF OR SECOND HALF :

OFFENDING :

901

903

904

902

905

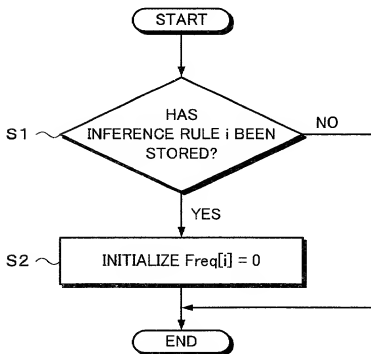
Fig. 10

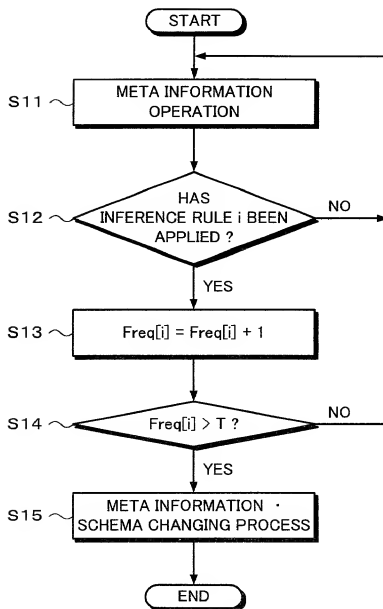
Fig. 11

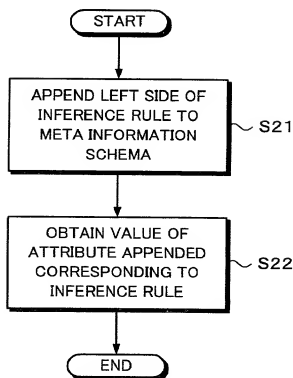
Fig. 12

Fig. 13

[inference rules]

offending (@inning, @team) : -

game (@inning, @s), visitor (@s, @team), first half or second half (@inning, "first half") \sim 702

offending (@inning, @team) : -

game (@inning, @s), home (@s, @team), first half or second half (@inning, "second half") \sim 703

[meta information schema]

Inning {		}	1301
game :	[BaseballGame]		
inning :	[N]		
first half or second half :	[first half or second half]		
offending :	[team name]		
}			

[meta information]

<Inning ID = "StreamID#100">	}	1302
<game resource = "StreamID#100"/>		
<inning> 3 </inning>		
<first half or second half> first half </first half or second half>		
<offending> Hanshin </offending>		
</Inning>		

<Inning ID = "StreamID#101">	}	1303
<game resource = "StreamID#100"/>		
<inning> 3 </inning>		
<first half or second half> second half </first half or second half>		
<offending> Kyojin </offending>		
</Inning>		

Fig. 14

```

News {
    program name :    [text]
    announcer :      [name]
    . . .
}
Movie {
    title :           [text]
    actor :           [name]
    . . .
}

```

Fig. 15

```

<News about = "ID#1">
    <program name> Seven o'clock news </program name>
    <announcer> Tokkyo Hanako </announcer>
    . . .
</News>

<Movie about = "ID#100">
    <title> Some Movie </title>
    <actor> Tokkyo Taro </actor>
</Movie>

```

Fig. 16

```

performer (@news, @person) : -
    announcer (@news, @person). ~ 1601
performer (@movie, @person) : -
    actor (@movie, @person). ~ 1602

```

Fig. 17

```

News {
    program name :    [text]
    performer :      [name]
    . . .
}

Movie {
    title :           [text]
    performer :       [name]
    . . .
}

```

Fig. 18

```

<News about = "ID#1">
    <program name> seven o'clock news </program name>
    <performer> Tokkyo Hanako </performer>
    . . .
</News>

<Movie about = "ID#100">
    <title> Some Movie </title>
    <performer> Tokkyo Taro </performer>
</Movie>

```

Fig. 19

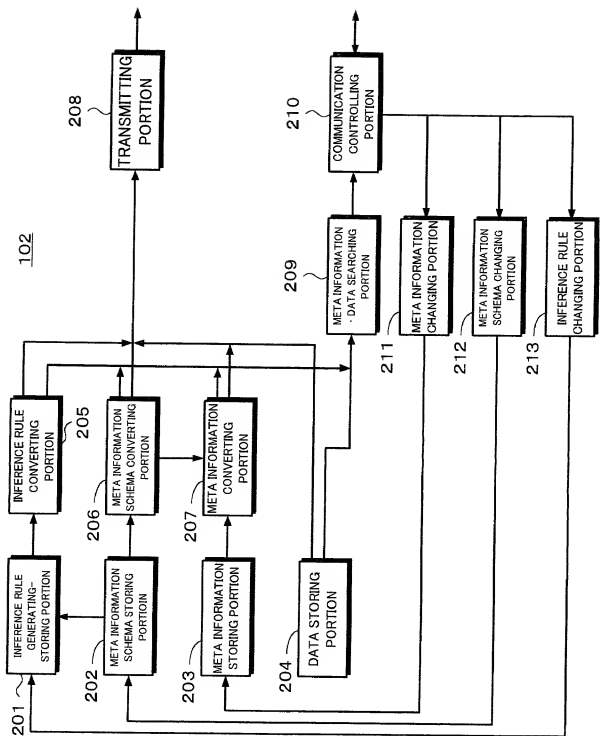


Fig. 20

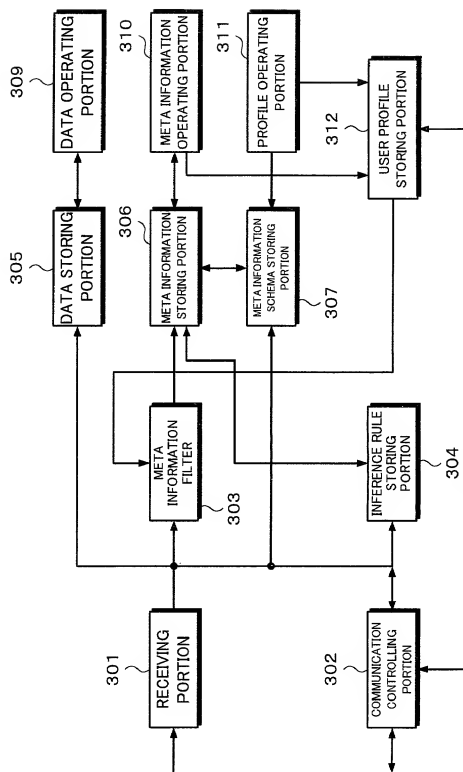


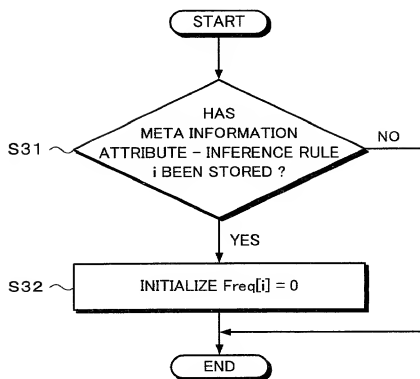
Fig. 21

Fig. 22

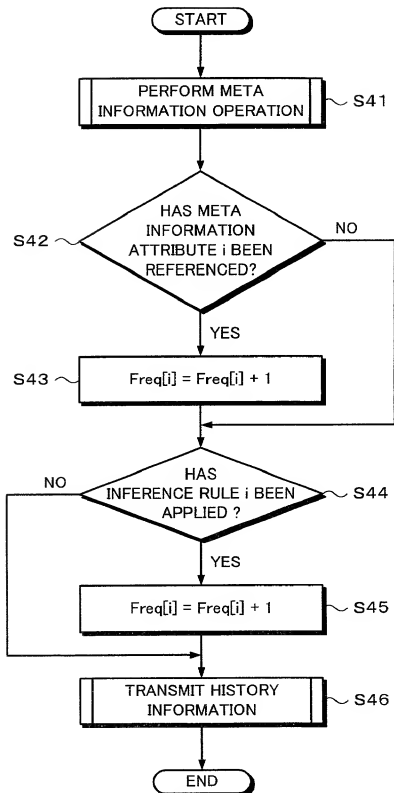


Fig. 23

[inference rule]

offending (@inning, @team) : -

game (@inning, @s), visitor (@s, @team), first half or second half (@inning, "first half") \sim 702

offending (@inning, @team) : -

game (@inning, @s), home (@s, @team), first half or second half (@inning, "second half") \sim 703

[meta information schema]

Inning {

game : [BaseballGame]

inning : [N]

offending : [team name]

}

2301

[meta information]

<Inning ID = "StreamID#100">

<game resource = "StreamID#100"/>

<inning> 3 </inning>

<offending> Hanshin </offending>

</Inning>

2302

<Inning ID = "StreamID#101">

<game resource = "StreamID#100"/>

<inning> 3 </inning>

<offending> Kyojin </offending>

</Inning>

2303

201 INFERENCE RULE GENERATING - STORING PORTION
202 META INFORMATION SCHEMA STORING PORTION
203 META INFORMATION STORING PORTION
204 DATA STORING PORTION
210 COMMUNICATION CONTROLLING PORTION
211 META INFORMATION CHANGING PORTION
212 META INFORMATION SCHEMA CHANGING PORTION
213 INFERENCE RULE CHANGING PORTION
302 COMMUNICATION CONTROLLING PORTION
308 META INFORMATION / SCHEMA CHANGING PORTION
310 META INFORMATION OPERATING PORTION
312 USER PROFILE STORING PORTION

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TRANSMITTING APPARATUS, RECEIVING
APPARATUS, TRANSMITTING AND RECEIVING
APPARATUS, TRANSMITTING METHOD, RECEIVING
METHOD, AND TRANSMITTING AND RECEIVING
METHOD

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☒ was filed on March 15, 2000
as United States Application Number of
PCT International Application Number PCT/JP00/01560
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Prior Foreign Application(s)

Priority Not Claimed

外国での先行出願

優先権主張なし

075870/1999

Japan

(Number)

(Country)

(番号)

(国名)

19 March 1999
(Day/Month/Year Filed)☐

PCT/JP00/01560

PCT

(Number)

(Country)

(番号)

(国名)

15 March 2000
(Day/Month/Year Filed)☐

(Number)

(Country)

(番号)

(国名)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(番号)

(国名)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(番号)

(国名)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(番号)

(国名)

(Day/Month/Year Filed)

☐

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)

(Filing Date)

(出願番号)

(出願日)

(Application No.)

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(出願番号)

(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of application.

(Status: Patented, Pending, Abandoned)

(状況: 特許許可、係属中、放棄)

(Application No.)

(Filing Date)

(出願番号)

(出願日)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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書類送付先

直通電話連絡先：(氏名及び電話番号)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

WILLIAM S. FROMMER, Registration No. 25,506 and
DENNIS M. SMID, Registration No. 34,930

Send Correspondence to:

WILLIAM S. FROMMER, Esq.
c/o FROMMER LAWRENCE & HAUG LLP
745 Fifth Avenue
New York, New York 10151

Direct Telephone Calls to: (212) 588-0800

To the attention of: WILLIAM S. FROMMER

Full name of sole or first inventor

唯一または第一発明者氏名

発明者の署名

日付

住所

国籍

郵便の宛先

Yumihiko NISHIO

Inventor's signature

Date

Residence

TOKYO

Citizenship

Japan

Post Office Address:

Sony Corporation
7-35 Kitashinagawa 6-Chome
Shinagawa-Ku, Tokyo 141, Japan

full name of second joint inventor, if any

第二共同発明者がある場合、その氏名

第二共同発明者の署名

日付

住所

国籍

郵便の宛先

Yoshihisa GONNO

Second Inventor's signature

Date

Residence

KANAGAWA

Citizenship

Japan

Post Office Address:

Sony Corporation
7-35 Kitashinagawa 6-Chome
Shinagawa-Ku, Tokyo 141, Japan

(第三以下の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors)

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書類送付先

直通電話連絡先：（氏名及び電話番号）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

WILLIAM S. FROMMER, Registration No. 25,506 and
DENNIS M. SMID, Registration No. 34,930

Send Correspondence to:
WILLIAM S. FROMMER, Esq.
c/o FROMMER LAWRENCE & HAUG LLP
745 Fifth Avenue
New York, New York 10151

Direct Telephone Calls to: (212) 588-0800
To the attention of: **WILLIAM S. FROMMER**

第三共同発明者がある場合、その氏名

第三共同発明者の署名

日付

住所

国籍

郵便の宛先

第四共同発明者がある場合、その氏名

第四共同発明者の署名

日付

住所

国籍

郵便の宛先

Full name of third joint inventor, if any

B-W Kazuo HARAOKA

Third inventor's signature

Date

Residence

KANAGAWA

Citizenship

Japan

Post Office Address:

Sony Corporation
7-35 Kitashinagawa 6-Chome
Shinagawa-Ku, Tokyo 141, Japan

Full name of fourth joint inventor, if any

Y-W Yasuaki YAMAGISHI

Fourth inventor's signature

Date

Residence

KANAGAWA

Citizenship

Japan

Post Office Address:

Sony Corporation
7-35 Kitashinagawa 6-Chome
Shinagawa-Ku, Tokyo 141, Japan

(第五以下の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for fifth and subsequent joint inventors)

日本語宣言書

委任状：私は本出願を審査する手続を行い、且つ米国特許商標庁との全ての業務を遂行するために、記名された発明者として、下記の弁護士及び/または弁理士を任命する。(氏名及び整理番号を記載すること)

書類送付先

直通電話連絡先：(氏名及び電話番号)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

WILLIAM S. FROMMER, Registration No. 25,506 and
DENNIS M. SMID, Registration No. 34,930

Send Correspondence to:

WILLIAM S. FROMMER, Esq.
c/o FROMMER LAWRENCE & HAUG LLP
745 Fifth Avenue
New York, New York 10151

Direct Telephone Calls to: (212) 588-0800

To the attention of: **WILLIAM S. FROMMER**

Full name of fifth joint inventor, if any

Kazuhiko TAKABAYASHI

Fifth inventor's signature

Date

Kazuhiko TakabayashiJanuary 29, 2001

Residence

TOKYO

Citizenship

Japan

Post Office Address:

Sony Corporation
7-35 Kitashinagawa 6-Chome
Shinagawa-Ku, Tokyo 141, Japan

Full name of sixth joint inventor, if any

Sixth Inventor's signature

Date

Residence

Citizenship

Post Office Address:

(Supply similar information and signature for seventh and subsequent joint inventors)

第五共同発明者がある場合、その氏名

第五共同発明者の署名

日付

住所

国籍

郵便の宛先

第六共同発明者がある場合、その氏名

第六共同発明者の署名

日付

住所

国籍

郵便の宛先

(第七以下の共同発明者についても同様に記載し、署名をすること)